

CALIFORNIA STATE TEACHERS' RETIREMENT BOARD

INVESTMENT COMMITTEE

SUBJECT: Report on Cash Equitization Program

ITEM NUMBER: 10

ATTACHMENT(S): 1

ACTION: _____

DATE OF MEETING: June 7, 2000

INFORMATION: X

PRESENTER(S): Mr. Tong

EXECUTIVE SUMMARY

One of the 1999/2000 objectives approved for the Investment Branch is to examine the progress achieved in implementing the Cash Equitization program (Program). On October 7, 1998, the Investment Committee approved the implementation of the Program. The Program provides a mechanism which enables CalSTRS' domestic equity exposure to remain closer to the adopted strategic asset allocation policy target. As a result, CalSTRS would be able to maintain total domestic equity market exposure and minimize expected tracking error without impacting the domestic equity manager's investment decisions. In January 1999, the Investment Committee approved the policies for the Program.

The Program began operations on May 3, 1999. CalSTRS used cost-effective trading strategies to achieve the Program's objectives. These strategies resulted in a series of purchases over time. The objective of the trading strategies was to minimize transaction costs. The purchases were completed in 6 months, beginning after the infrastructure had been established. As of March 31, 2000, Program's exposure to the S&P 500 was approximately \$147.2 million.

The Program has performed as expected during the past eleven months. The total value has increased as shown in page 4 of Attachment 1. We are please to report that for the 1st quarter of 2000 the Program has a positive tracking error as shown in page 5 of Attachment 1.

Background

This report reviews the rationale and use of cash equitization at California State Teachers' Retirement System (CalSTRS). The overall objective of this report is to provide the Investment Committee with information in determining the progress of the Cash Equitization program (Program). Specifically, the report reviews the development and success of this Program.

In October 1998, the Investment Committee approved the concept of cash equitization for use within the domestic equity asset class. The primary intent of cash equitization is to create a mechanism for keeping the domestic equity exposure as close as practically possible to the adopted strategic asset allocation policy target.

In January 1999, the Board adopted policies to establish and operate a cash equitization program within the domestic equity class. The Program began operations on May 3, 1999. CalSTRS' Internal Equities and Fixed Income staff administer the Program.

On March 31, 2000, the Program completed its first eleven months of operations. With approximately \$147.2 million of cash equitized, the internal program produced performance results that met expectations.

Conceptual Review

A cash equitization program relies heavily on derivative instruments to implement its investment strategy of matching equity market returns. The most important derivative instrument is the equity index futures contract. The next several sections review some important issues associated with managing and investing equity futures contracts.

Description of Equity Index Futures Contracts

Equity index futures contracts (e.g., S&P 500 futures contract) have existed for more than a decade. The S&P 500 futures contract was introduced in April 1982.

A futures contract is an agreement to make or accept delivery of the underlying asset at a specified date in the future and at a specified price. Equity futures are settled for cash based on the price of the underlying equity index. Because a futures contract promises to deliver the underlying index sometime in the future, the price of the futures contract includes the cost of carrying the underlying index. This carrying cost, however, is reduced by the amount of dividends earned by the underlying index during the carrying period.

Buying a S&P 500 futures contract is approximately equivalent to purchasing a S&P 500 stock index and carrying it to expiration of the contract. However, it is often preferable to hold a

futures contract instead of the actual shares that comprise the index because (i) it is often less costly to trade a futures contract rather than the actual basket of securities and (ii) the markets for futures contracts are often more liquid than the markets for their underlying individual securities.

To implement a cash equitization program, futures contracts are purchased at fair value and combined with an investment in short-term fixed income instruments. The combination of these activities should closely match the total return of the underlying index. One important aspect of executing this approach is that the futures contract has to be rolled over before expiration to maintain continuous equity exposure. Otherwise, the futures contract would expire, resulting in significant losses.

Maintaining Equity Exposure

The Board has adopted a set of standard investment guidelines for its domestic equity accounts. Within these guidelines, the Board established a maximum of 10% cash position for each individual portfolio. This guideline gives the CalSTRS' manager flexibility to hold some cash as it is transitioning its portfolio to implement its investment strategy. However, any continued exposure to cash may reduce the ability of the overall domestic equity portfolio to track the asset class's benchmark (i.e., increase the portfolio's "tracking error"). Tracking error declines significantly when the size of cash holding is reduced to a smaller proportion. Equity index futures can be used to convert these cash balances to equity market exposure as needed. Currently, CalSTRS is using S&P 500 futures contracts to equitize cash that is waiting to be invested in the domestic equity market by the active and passive managers. Using such futures contracts is the lowest-cost method for pension funds to establish and maintain equity exposure.

Consider the following example of a pension fund looking to equitize \$150 million using S&P 500 Index futures, with a 10% equity return and 4% return on short-term cash instruments. With equitizing, the gain can be calculated as follows:

Impact Due to Difference Between Equity and Cash Returns

| | |
|---------------------------------------|------------------|
| Total Domestic Equity Assets | \$38,000,000,000 |
| Average Cash Balance During Year | \$150,000,000 |
| Gain $(0.10-0.04) \times 150,000,000$ | \$9,000,000 |

If a cash equitization program has a return close to 10%, the pension fund would retain a significant portion of the \$9.0 million gain versus simply investing the cash balance in money market instruments.

Cost of Equity Index Futures Contracts

An attractive feature of using equity index futures contracts in various portfolio management strategies (e.g., cash equitization) is their relatively low transaction costs. Trading costs are much lower for index futures transactions than for stock securities that trade in the cash markets. Table 1 below illustrates the costs for stock portfolio trades and equivalent futures transactions in the U.S. stock market.

**Table 1. Comparison of S&P 500 Futures and Stock Portfolio Trading Costs
(One-Way in Basis Points with S&P 500 at 1320)**

| | <u>Stock Portfolio</u> | <u>Futures</u> |
|------------------------|------------------------|----------------|
| Commission | 4.9 | 0.2 |
| Market Impact | | |
| During the Trading Day | 16.4 | 7.6 |
| Market on Cash Close | 0.0 | 5.3 |
| Total Cost | | |
| During the Trading Day | 21.3 | 7.8 |
| Market on Cash Close | 4.9 | 5.5 |

Assumptions:

Commission costs are \$6 one-way per futures contract and \$0.03 per share.
Futures and stock portfolio value is \$100 million.

Source: Salomon Smith Barney

Current Status of the Cash Equitization Program

A detailed examination of the Cash Equitization Program was conducted for the period from May 3, 1999 through March 31, 2000. Table 2 shows the allocations to the Program since its inception.

Table 2: Cash Equitization Program

| Date | Number of Futures Contracts | Average Index Level Purchased | Notional Value | Cumulative Notional Value |
|-------------|--|--|-----------------------|--------------------------------------|
| 05/03/99 | 37 | 1333.93 | 12,338,843 | 12,338,843 |
| 05/04/99 | 37 | 1334.42 | 12,343,398 | 24,682,240 |
| 05/05/99 | 20 | 1325.54 | 6,627,700 | 31,309,940 |
| 05/06/99 | 17 | 1335.71 | 5,676,750 | 36,986,690 |
| 05/07/99 | 10 | 1333.75 | 3,334,375 | 40,321,065 |
| 05/17/99 | 20 | 1327.88 | 6,639,400 | 46,960,465 |
| 05/18/99 | 10 | 1329.05 | 3,322,625 | 50,283,090 |
| 07/21/99 | 20 | 1375.59 | 6,877,950 | 57,161,040 |
| 07/22/99 | 60 | 1366.82 | 20,502,288 | 77,663,328 |
| 07/23/99 | 35 | 1361.12 | 11,909,763 | 89,573,090 |
| 07/26/99 | 10 | 1349.90 | 3,374,750 | 92,947,840 |
| 07/29/99 | 10 | 1339.90 | 3,349,750 | 96,297,590 |
| 08/05/99 | 14 | 1299.72 | 4,549,015 | 100,846,605 |
| 08/09/99 | 8 | 1300.16 | 2,600,310 | 103,446,915 |
| 09/30/99 | 30 | 1282.71 | 9,620,325 | 113,067,240 |
| 10/01/99 | 15 | 1274.46 | 4,779,213 | 117,846,453 |
| 10/14/99 | 10 | 1272.68 | 3,181,700 | 121,028,153 |
| 10/15/99 | 15 | 1256.65 | 4,712,438 | 125,740,590 |
| 10/26/99 | 15 | 1283.53 | 4,813,238 | 130,553,828 |

On average, the cash balance across the entire domestic equity portfolio has been approximately \$180 million. CalSTRS equitizes approximately 80% of the aggregate domestic equity portfolio's cash balance. Staff expects to equitize an equivalent proportion of the cash balance going forward as the equitization program matures.

Performance of the Cash Equitization Program

The objective for the Program is to closely match the performance of the S&P 500 Index. Table 3 shows the Program's performance for the 3 month period ending March 31, 2000. The

information compares the Program's performance with the returns of the Index. The Program's return for the past 3 months was 2.393% while the index return was 0.099% lower at 2.294%. These returns incorporate transaction costs.

Table 3: Cash Equitization Program Performance

| Total Return | Program | S&P 500 Index | Tracking Error |
|---------------------|----------------|--------------------------|-----------------------|
| 12/31/99 – 3/31/00 | 2.393% | 2.294% | 0.099% |

The Program enables CalSTRS to maintain the cash positions while providing domestic equity market exposure. Table 4 below shows that hedging cash balances added approximately \$9.9 million to the CalSTRS investment portfolio.

Table 4: Summary of Cash Equitization Program As of March 31, 2000

| | |
|--|-----------------|
| \$ Value of Equitized Cash Balance | \$147.2 million |
| \$'s Gained Through Investing Cash In Equity Futures | \$16.6 million |
| Less: \$'s Gained if Invested in Cash | \$6.7 million |
| Equals: Gross \$'s Gained due to Equitization | \$9.9 million |

Conclusion

The Cash Equitization program has enabled CalSTRS to remain closer to the Board's adopted asset allocation policy targets. The Program minimized the performance drag attributable to domestic equity manager cash.